

WHAT IS CLAIMED IS:

1. A loose tube optical cable comprising:
 - (a) a central tensile member extended in a longitudinal direction at the center of the optical cable;
 - (b) a plurality of cable aggregation units twisted and extended in a longitudinal direction on an outer circumference of the central tensile member and having at least one loose tube optical fiber unit;
 - (c) a fibered tension-reinforcing member for surrounding a cable core aggregation including the central tensile member and the cable aggregation units; and
 - (d) a cable coating for longitudinally surrounding the cable core aggregation surrounded by the fibered tension-reinforcing member,
wherein the number of the cable aggregation units is 4 or less, and each cable aggregation unit is faced and substantially contacted with other two adjacent cable aggregation units.
2. A loose tube optical cable according to claim 1, wherein the loose tube optical fiber unit has a tube made of plastic.
3. A loose tube optical cable according to claim 1,
wherein the cable core aggregation has 1+3 structure, and
wherein a plurality of the cable aggregation units are composed of three loose tube optical fiber units, two loose tube optical fiber units and one inclusion, or
one loose tube optical fiber unit and two inclusions.

4. A loose tube optical cable according to claim 1,
wherein the cable core aggregation has 1+4 structure, and
wherein a plurality of the cable aggregation units are composed of four loose
5 tube optical fiber units, three loose tube optical fiber units and one inclusion, two
loose tube optical fiber units and two inclusions, or one loose tube optical fiber unit
and three inclusions.

5. A loose tube optical cable according to claim 1, further comprising
10 wired tension-reinforcing members formed in the cable coating in opposite positions
substantially as much as 180°, and extended in a longitudinal direction.

6. A loose tube optical cable according to claim 5,
wherein the wired tension-reinforcing member is made of FRP (Fiber glass
15 Reinforced Plastic), steel wire or plastic-coated steel wire, or their combination.

7. A loose tube optical cable according to claim 1 or 5, further
comprising a ring-shaped tension-reinforcing member formed in the cable coating
and extended substantially coaxially with the central tensile member.

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8. A loose tube optical cable according to claim 7,
wherein the ring-shaped tension-reinforcing member is made of glass yarn or
Aramid yarn, or their combination.

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9. A loose tube optical cable according to claim 1,

wherein a plurality of the cable aggregation units are helically twisted or SZ-twisted in a longitudinal direction around the central tensile member.

10. A loose tube optical cable comprising:

5 (a) a central tensile member extended in a longitudinal direction at the center of the optical cable;

(b) a plurality of cable aggregation units twisted and extended in a longitudinal direction on an outer circumference of the central tensile member and having at least one loose tube optical fiber unit;

10 (c) a cable coating for surrounding a cable core aggregation including the central tensile member and a plurality of the cable aggregation units; and

(d) wired tension-reinforcing members formed in the cable coating in opposite positions substantially as much as 180° and extended in a longitudinal direction,

15 wherein the number of the cable aggregation units is 4 or less, and each cable aggregation unit is faced and substantially contacted with other two adjacent cable aggregation units.

11. A loose tube optical cable according to claim 10, wherein the loose tube optical fiber unit has a tube made of plastic.

12. A loose tube optical cable according to claim 10,
wherein the cable core aggregation has 1+3 structure, and
wherein a plurality of the cable aggregation units are composed of three
25 loose tube optical fiber units, two loose tube optical fiber units and one inclusion, or

one loose tube optical fiber unit and two inclusions.

13. A loose tube optical cable according to claim 10,
wherein the cable core aggregation has 1+4 structure, and
5 wherein a plurality of the cable aggregation units are composed of four loose
tube optical fiber units, three loose tube optical fiber units and one inclusion, two
loose tube optical fiber units and two inclusions, or one loose tube optical fiber unit
and three inclusions.

10 14. A loose tube optical cable according to claim 10,
wherein the wired tension-reinforcing member is made of FRP (Fiber glass
Reinforced Plastic), steel wire or plastic-coated steel wire, or their combination.

15. A loose tube optical cable according to claim 10, further comprising
15 a fibered tension-reinforcing member for surrounding the cable core aggregation in
a longitudinal direction.

16. A loose tube optical cable according to claim 15,
wherein the fibered tension-reinforcing member is made of glass yarn or
20 Aramid yarn, or their combination.

17. A loose tube optical cable according to claim 10 or 15, further
comprising a ring-shaped tension-reinforcing member formed in the cable coating
and extended substantially coaxially with the central tensile member.

18. A loose tube optical cable according to claim 17,
wherein the ring-shaped tension-reinforcing member is made of glass yarn or
Aramid yarn, or their combination.

5 19. A loose tube optical cable according to claim 10,
wherein a plurality of the cable aggregation units are helically twisted or SZ-
twisted around the central tensile member.

20. A loose tube optical cable comprising:
10 (a) a central tensile member extended in a longitudinal direction at the center
of the optical cable;
(b) a plurality of cable aggregation units twisted and extended in a
longitudinal direction on an outer circumference of the central tensile member and
having at least one loose tube optical fiber unit;
15 (c) a cable coating for surrounding a cable core aggregation including the
central tensile member and a plurality of the cable aggregation units; and
(d) a ring-shaped tension-reinforcing member formed in the cable coating
and extended substantially coaxially with the central tensile member,
wherein the number of the cable aggregation units is 4 or less, and each
20 cable aggregation unit is faced and substantially contacted with other two adjacent
cable aggregation units.

21. A loose tube optical cable according to claim 20, wherein the loose
tube optical fiber unit has a tube made of plastic.

22. A loose tube optical cable according to claim 20,
wherein the cable core aggregation has 1+3 structure, and
wherein a plurality of the cable aggregation units are composed of three
loose tube optical fiber units, two loose tube optical fiber units and one inclusion, or
5 one loose tube optical fiber unit and two inclusions.

23. A loose tube optical cable according to claim 20,
wherein the cable core aggregation has 1+4 structure, and
wherein a plurality of the cable aggregation units are composed of four loose
10 tube optical fiber units, three loose tube optical fiber units and one inclusion, two
loose tube optical fiber units and two inclusions, or one loose tube optical fiber unit
and three inclusions.

24. A loose tube optical cable according to claim 20,
15 wherein the ring-shaped tension-reinforcing member is made of glass yarn or
Aramid yarn, or their combination.

25. A loose tube optical cable according to claim 20, further comprising
a fibered tension-reinforcing member for surrounding the cable core aggregation in
20 a longitudinal direction.

26. A loose tube optical cable according to claim 25,
wherein the fibered tension-reinforcing member is made of glass yarn or
Aramid yarn, or their combination.

27. A loose tube optical cable according to claim 20 or 25, further comprising wired tension-reinforcing members formed in the cable coating in opposite positions substantially as much as 180° and extended in a longitudinal direction.

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28. A loose tube optical cable according to claim 27, wherein the wired tension-reinforcing member is made of FRP (Fiber glass Reinforced Plastic), steel wire or plastic-coated steel wire, or their combination.

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29. A loose tube optical cable according to claim 20, wherein a plurality of the cable aggregation units are helically twisted or SZ-twisted around the central tensile member.